CLAIMS

1. A process for manufacturing a tyre comprising the steps of:

- providing an elastomeric layer on an outer surface of a toroidal support (10), said surface having a shape substantially matching a shape of an inner surface of said tyre;
- manufacturing a green tyre (50) by assembling the structural elements thereof on the toroidal support provided with the elastomeric layer;
- introducing the green tyre supported on the toroidal support into a moulding cavity (104) whose inner walls have a shape substantially matching a shape of an outer surface of the tyre;
- at least partially precuring the elastomeric layer by heating the toroidal support;
- introducing a primary working fluid into at least one diffusion gap defined between the inner surface of the green tyre and the toroidal support in order to press the outer surface of the green tyre against the inner walls of the moulding cavity, and
- curing the green tyre,

wherein at least a portion of the radially inner surface of the toroidal support is provided with a plurality of protruding elements (207).

2. Process according to claim 1, wherein the protruding elements (207) are in the form of elongated ribs.

3. Process according to claim 1, wherein the protruding elements (207) define a honeycomb structure.

4. Process according to claim 1, wherein the protruding elements (207) protrude inwardly the toroidal support (10).

5. Process according to claim 1, wherein the protruding elements (207) are obtained in the thickness of the toroidal support (10).

6. Process according to claim 1, wherein the protruding elements (207) are produced separately from the toroidal support (10) and successively coupled to the radially inner surface thereof.

7. Process according to claim 6, wherein the coupling of the protruding elements (207) to the toroidal support (10) is performed by welding.

8. Process according to claim 1, wherein the step of at least partially precuring the elastomeric layer is carried out after the step of providing the elastomeric layer on the outer surface of the toroidal support (10).

9. Process according to claim 1, wherein the step of at least partially precuring the elastomeric layer is carried out after the step of manufacturing the green tyre (50) on said toroidal support (10).

10. Process according to claim 1, wherein the heating of the toroidal support (10) is carried by introducing the primary working fluid into said at least one diffusion gap.

11. Process according to claim 10, wherein the outer surface of the toroidal support (10) is heated to a predetermined working temperature for precuring the inner surface of the green tyre (50).

12. Process according to claim 1, further comprising the step of pressing the inner surface of the green tyre (50) against the outer surface of the toroidal support (10) through at least one secondary working fluid.

13. Process according to claim 12, wherein during said step of pressing the pressure of the secondary working fluid is greater than the pressure of the primary working fluid.

14. Process according to claim 1, wherein the pressure of the primary working fluid is lower than 16 bar.

15. Process according to claim 12, wherein the pressure of the secondary working fluid is included between 8 and 18 bar.

16. Process according to claim 1, wherein during the step of pressing the outer surface of the green tyre (50) against the walls of the moulding cavity (104) by means of the primary working fluid, the pressure of the primary working fluid is included between 18 and 35 bar.

17. Process according to claim 1, wherein the temperature of the primary working fluid is included between 170 °C and 210 °C.

18. Process according to claim 1, wherein the primary working fluid is steam, nitrogen, air, or a mixture thereof.

19. Process according to claim 12, wherein the step of pressing is carried out before the step of heating the toroidal support (10).

20. Process according to claim 12, wherein the step of pressing is carried out after the step of heating the toroidal support (10).

21. Process according to claim 12, wherein the step of pressing is carried out simultaneously with the step of heating the toroidal support (10).
22. Process according to claim 5, wherein the protruding elements (207) are obtained by milling.
23. A toroidal support (10) for manufacturing a green tyre (50) thereupon, the support comprising a plurality of circumferential sectors (200; 300) defining the outer surface of the toroidal support, said outer surface having a shape which substantially matches the shape of the inner surface of said green tyre, wherein at least a portion of the radially inner surface of the toroidal support is provided with a plurality of protruding elements (207).
24. Toroidal support according to claim 23, wherein the protruding elements (207) are in the form of elongated ribs.
25. Toroidal support according to claim 23, wherein the protruding elements (207) define a honeycomb structure.
26. Toroidal support according to claim 23, wherein the protruding elements (207) protrude inwardly the toroidal support (10).
27. Toroidal support according to claim 23, wherein the protruding elements (207) are obtained in the thickness of the toroidal support (10).
28. Toroidal support according to claim 23, wherein the protruding elements (207) are produced separately from the toroidal support (10) and successively coupled to the radially inner surface thereof.

29. Toroidal support according to claim 28, wherein the coupling of the protruding elements (207) to the toroidal support (10) is performed by welding.

30. Toroidal support according to claim 23, wherein the protruding elements (207) are distributed on the radially inner surface of the toroidal support corresponding to the crown portion of the green tyre (50).

31. Toroidal support according to claim 23, wherein the protruding elements (207) are distributed on the radially inner lateral surfaces of the toroidal support corresponding to the sidewalls of the green tyre (50).

32. Toroidal support according to claim 23, wherein the protruding elements (207) are distributed on the outer surfaces of a sector attachment plate (205) of the toroidal support (10).

33. Toroidal support according to claim 23, wherein the protruding elements (207) are disposed parallel to each other.

34. Toroidal support according to claim 23, wherein a pitch between two successive protruding elements (207) is substantially constant along the development of said protruding elements.

35. Toroidal support according to claim 30, wherein the protruding elements (207) lie in a plane substantially perpendicular to the equatorial plane of the toroidal support (10).

36. Toroidal support according to claim 30, wherein the protruding elements (207) extend in a direction substantially perpendicular to a circumferential direction.

37. Toroidal support according to claim 30, wherein the protruding elements (207) extend in a direction substantially parallel to a circumferential direction.

38. Toroidal support according to claim 31, wherein the protruding elements (207) lie in a plane (t-t) which is inclined of an angle (α) with respect to a plane parallel to the equatorial plane of the toroidal support (10).

39. Toroidal support according to claim 38, wherein said angle (α) ranges from 0° to 45°.

40. Toroidal support according to claim 38, wherein said angle (α) is substantially constant along the development of the protruding elements.

41. Toroidal support according to claim 28, wherein said angle (α) increases in moving away from the equatorial plane of the toroidal support (10).

42. Toroidal support according to claim 23, wherein the protruding elements (207) are continuous along the radially inner surface of the sector.

43. Toroidal support according to claim 23, wherein the protruding elements (207) present at least one interruption along their longitudinal development.

44. Toroidal support according to claim 23, wherein the circumferential sides (201; 202) of the sectors (200; 300) are provided with notches radially extending along the thickness of the toroidal support (10).

45. Toroidal support according to claim 23, wherein the lateral inner surfaces of the toroidal support (10) are concave.

46. Toroidal support according to claim 45, wherein said lateral inner surfaces are parallel to the

radially outer profile of the toroidal support (10).

47. Toroidal support according to claim 23, wherein the lateral inner surfaces of the toroidal support (10) are parallel to the equatorial plane of the toroidal support.